JVC

SERVICE MANUAL

COLOR TELEVISION

AV-27F476/R, AV-27F476/S, AV-32F476/Y, AV-32F476/Z

BASIC CHASSIS
GJ5

I'Art™

BBE

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SPECIFICATION

Items		Contents	
		AV-27F476	AV-32F476
Dimensions (W × H × D)		82.9 cm × 59.3 cm × 51.9 cm (32-3/4" × 23-3/8" × 20-1/2")	93.9 cm × 68.5 cm × 57cm (37" × 27" × 22-1/2")
Mass		43.0 kg (94.6 lbs)	64.0 kg (140.8 lbs)
TV RF System		CCIR (M)	
Color System		NTSC	
Sound System		BTSC (Multi Channel Sound)	
Teletext System		Closed Caption (T1 - T4 / CC1 - CC4)	
TV Receiving Channels and Frequency	VHF low VHF high UHF CATV	02ch - 06ch: 54 MHz - 88 MHz 07ch - 13ch: 174 MHz - 216 MHz 14ch - 69ch: 470 MHz - 806 MHz 54MHz - 804 MHz Low Band: 02 - 06 High Band: 07 - 13 Mid Band: 14 - 22 Super Band: 23 - 36 Hyper Band: 37 - 64 Ultra Band: 65 - 94, 100 - 135 Sub Mid Band: 01, 96 - 99	
TV / CATV Total Channel		181 Channels [Reception of channel A-5 ("95" of the TV set's on-screen CABLE channel) is recommended for your TV set.]	
Intermediate Frequency	Video IF Sound IF	45.75 MHz 41.25 MHz (4.5 MHz)	
Color Sub Carrier		3.58 MHz	
Power Input		AC120 V, 60 Hz	
Power Consumption		140 W	160 W
Picture Tube (Visible size)		68 cm (29") Measured diagonally (H: 55.4 cm × V: 41.8 cm)	80 cm (34") Measured diagonally (H: 65.6 cm × V : 49.6 cm)
High Voltage		30.0 kV ±1.3 kV [at Zero beam current]	31.4 kV ±1.3 kV [at Zero beam current]
Speaker		6.5 cm × 13 cm (2-1/2" × 5"), Oval type × 2	
Audio Power Output		9 W + 9 W	
Antenna Terminal (VHF / UHF)		F-type connector, 75 Ω unbalanced	
Video / Audio input [Input-1/2/3]	Component Video [Input-2] S-video [Input-1] Video Audio	RCA pin jack × 3 Y : 1V(p-p), 75 Ω, negative sync Pb/Pr : 0.7 V(p-p), 75 Ω Mini DIN 4-pin connector × 1 Y : 1 V(p-p), 75 Ω, negative sync C : 0.286 V(p-p)(burst signal), 75 Ω 1 V(p-p), 75 Ω, negative sync, RCA pin jack × 2 500 mV(rms)(-4dBs), high impedance, RCA pin jack × 6	
Audio Output (Fix)		500 mV(rms)(-4dBs), low Impedance, (400 kHz when modulated 100 %), RCA pin jack × 2	
Remote Control Unit		RM-C1258G (AA/R6/UM-3 battery × 2)	

Design & specifications are subject to change without notice.

SECTION 1
PRECAUTION

1.1 SAFETY PRECAUTIONS

(1) The design of this product contains special hardware, many circuits and components specially for safety purposes. For continued protection, no changes should be made to the original design unless authorized in writing by the manufacturer. Replacement parts must be identical to those used in the original circuits. Service should be performed by qualified personnel only.

(2) Alterations of the design or circuitry of the products should not be made. Any design alterations or additions will void the manufacturer's warranty and will further relieve the manufacturer of responsibility for personal injury or property damage resulting therefrom.

(3) Many electrical and mechanical parts in the products have special safety-related characteristics. These characteristics are often not evident from visual inspection nor can the protection afforded by them necessarily be obtained by using replacement components rated for higher voltage, wattage, etc. Replacement parts which have these special safety characteristics are identified in the parts list of Service manual. **Electrical components having such features are identified by shading on the schematics and by (⚠) on the parts list in Service manual**. The use of a substitute replacement which does not have the same safety characteristics as the recommended replacement part shown in the parts list of Service manual may cause shock, fire, or other hazards.

(4) **Use isolation transformer when hot chassis.**
The chassis and any sub-chassis contained in some products are connected to one side of the AC power line. An isolation transformer of adequate capacity should be inserted between the product and the AC power supply point while performing any service on some products when the HOT chassis is exposed.

(5) **Don't short between the LIVE side ground and ISOLATED (NEUTRAL) side ground or EARTH side ground when repairing.**
Some model's power circuit is partly different in the GND. The difference of the GND is shown by the LIVE : (⊥) side GND, the ISOLATED (NEUTRAL) : (⏚) side GND and EARTH : (⏚) side GND.
Don't short between the LIVE side GND and ISOLATED (NEUTRAL) side GND or EARTH side GND and never measure the LIVE side GND and ISOLATED (NEUTRAL) side GND or EARTH side GND at the same time with a measuring apparatus (oscilloscope etc.). If above note will not be kept, a fuse or any parts will be broken.

(6) If any repair has been made to the chassis, it is recommended that the B1 setting should be checked or adjusted (See B1 POWER SUPPLY check).

(7) The high voltage applied to the picture tube must conform with that specified in Service manual. Excessive high voltage can cause an increase in X-Ray emission, arcing and possible component damage, therefore operation under excessive high voltage conditions should be kept to a minimum, or should be prevented. If severe arcing occurs, remove the AC power immediately and determine the cause by visual inspection (incorrect installation, cracked or melted high voltage harness, poor soldering, etc.). To maintain the proper minimum level of soft X-Ray emission, components in the high voltage circuitry including the picture tube must be the exact replacements or alternatives approved by the manufacturer of the complete product.

(8) Do not check high voltage by drawing an arc. Use a high voltage meter or a high voltage probe with a VTVM. Discharge the picture tube before attempting meter connection, by connecting a clip lead to the ground frame and connecting the other end of the lead through a 10kΩ 2W resistor to the anode button.

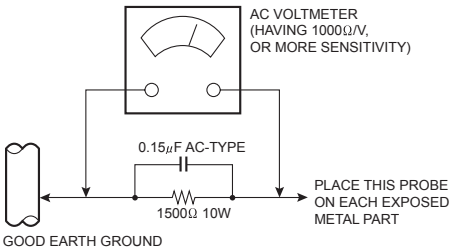
(9) When service is required, observe the original lead dress. Extra precaution should be given to assure correct lead dress in the high voltage circuit area. Where a short circuit has occurred, those components that indicate evidence of overheating should be replaced. Always use the manufacturer's replacement components.

(10) **Isolation Check (Safety for Electrical Shock Hazard)**
After re-assembling the product, always perform an isolation check on the exposed metal parts of the cabinet (antenna terminals, video/audio input and output terminals, Control knobs, metal cabinet, screw heads, earphone jack, control shafts, etc.) to be sure the product is safe to operate without danger of electrical shock.

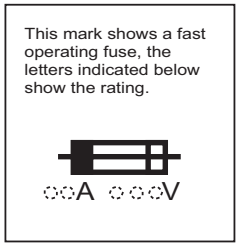
a) **Dielectric Strength Test**
The isolation between the AC primary circuit and all metal parts exposed to the user, particularly any exposed metal part having a return path to the chassis should withstand a voltage of 1100V AC (r.m.s.) for a period of one second.
(. . . . Withstand a voltage of 1100V AC (r.m.s.) to an appliance rated up to 120V, and 3000V AC (r.m.s.) to an appliance rated 200V or more, for a period of one second.) This method of test requires a test equipment not generally found in the service trade.

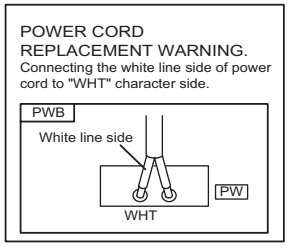
b) **Leakage Current Check**
Plug the AC line cord directly into the AC outlet (do not use a line isolation transformer during this check.). Using a "Leakage Current Tester", measure the leakage current from each exposed metal part of the cabinet, particularly any exposed metal part having a return path to the chassis, to a known good earth ground (water pipe, etc.). Any leakage current must not exceed 0.5mA AC (r.m.s.).
However, in tropical area, this must not exceed 0.2mA AC (r.m.s.).

Alternate Check Method
Plug the AC line cord directly into the AC outlet (do not use a line isolation transformer during this check.). Use an AC voltmeter having 1000Ω per volt or more sensitivity in the following manner. Connect a 1500Ω 10W resistor paralleled by a 0.15μF AC-type capacitor between an exposed metal part and a known good earth ground (water pipe, etc.). Measure the AC voltage across the resistor with the AC voltmeter. Move the resistor connection to each exposed metal part, particularly any exposed metal part having a return path to the chassis, and measure the AC voltage across the resistor. Now, reverse the plug in the AC outlet and repeat each measurement. Any voltage measured must not exceed 0.75V AC (r.m.s.). This corresponds to 0.5mA AC (r.m.s.).
However, in tropical area, this must not exceed 0.3V AC (r.m.s.). This corresponds to 0.2mA AC (r.m.s.).



(11) **High voltage hold down circuit check.**
After repair of the high voltage hold down circuit, this circuit shall be checked to operate correctly.See item **"How to check the high voltage hold down circuit"**.





SECTION 2
SPECIFIC SERVICE INSTRUCTIONS

2.1 FEATURES

SMART CAPTION
Smart caption will appear when you press the MUTING button, only on channels where the broadcast contains CLOSED CAPTION information.

SMART SOUND
Decreases high sound levels, giving a regulated sound level.

FLAT SQUARE CRT
It became legible from any position by CRT with few reflection and reflect lumps on the flat screen.

DIGITAL COMB FILTER
By the 3 line digital comb filter, the refreshed image can be seen.

VIDEO STATUS
Expression of a favorite screen can be chosen by the VIDEO STATUS function.

COMPONENT INPUT
Since the component signal input terminal is equipped, it reappears direct without deteriorating the signal from DVD.

V-CHIP
Since the V-CHIP is built in, it can choose, view and listen to a healthy program.

MTS STEREO
The voice multiplex function of the MTS system is built in. (MTS = Multi channel Television Sound system)

RETURN PLUS
You program a specific channel to return to while scanning through the channels using the CH+ and CH - keys.

VIDEO INPUT LABEL
This function is used to label video input connections for the onscreen displays.

WORLD CLOCK
The world clock feature provides time differences for some of the major cities around the world in real time.

BBE
High definition audio adds natural, clear and extraordinary sound quality to any program.

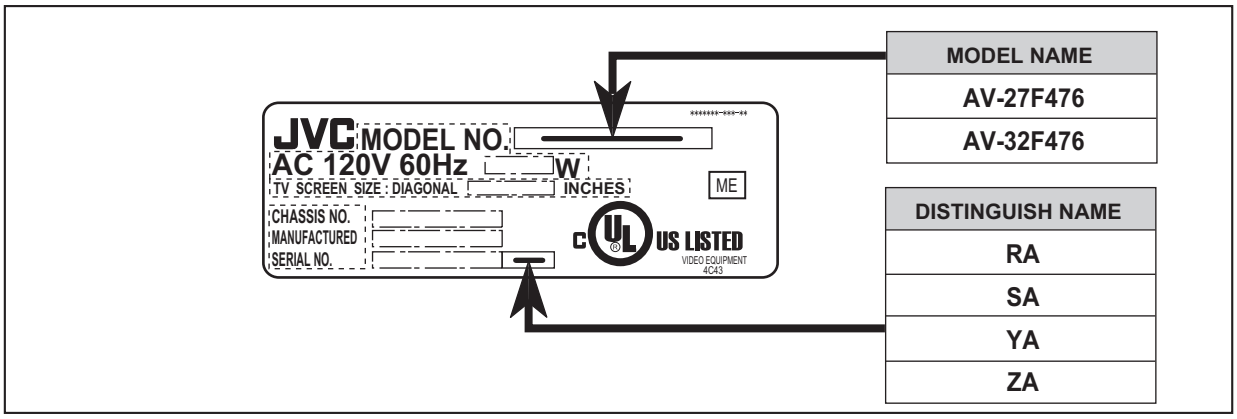
HYPER SURROUND
Creates a deep, three-dimensional sound effect by channeling the audio through the TV's front-firing speakers.

2.2 MAIN DIFFERENCE LIST

Item	AV-27F476/R	AV-27F476/S	AV-32F476/Y	AV-32F476/Z
PICTURE TUBE (ITC)	A68ELH021X201	A68QCP693X003	A80AKS90X03	A80ERF182X17
MAIN PWB	SGJ-1580A-M2	SGJ-1579A-M2	SGJ-1572A-M2	SGJ-1575A-M2
CRT SOCKET PWB	SGJ-3523A-M2	←	SGJ-3521A-M2	SGJ-3522A-M2

2.3 HOW TO IDENTIFY MODELS

How to recognize from the appearance of the model concerned is written below. Please distinguish from several contents currently printed on the rating label



2.4 TECHNICAL INFORMATION

2.4.1 MAIN MI-COM (CPU) PIN FUNCTION

Pin No.	Pin name	I/O	Function	Pin No.	Pin name	I/O	Function
1	MTS_ADJ	I	Not used	29	YC_GND	-	GND
2	AFT1	I	AFT voltage for tuner (Tuning frequency control)	30	V1_IN	I	Not used
3	KEY	I	Key scan for front control [No signal: H]	31	ABCL	I	Current for automatic beam (brightness)/contrast limit
4	uP_DVss	-	GND	32	MONITOR_OUT	O	Not used
5	Reset	I	CPU reset [Reset: L]	33	BLACK_DET	-	Black level detection filter
6	8MHz_OUT	O	CPU system clock: 8MHz oscillation	34	SVM_OUT	O	Y signal for scan velocity scan modulation
7	8MHz_IN	I	CPU system clock: 8MHz oscillation	35	APL_FIL	-	Average picture level filter
8	TEST	-	GND	36	APC_FIL	-	Automatic phase control filter
9	uP_DVDD	I	5V	37	fsc_OUT	O	Color sub carrier (3.58MHz) for 3-line digital comb filter [IC5201]
10	AGC_MUTE	O	AGC muting for tuner (when channel select) [Muting : H]	38	YC_Vcc	I	5V (for video process circuit)
11	uP_VVSS	-	GND	39	R_OUT	O	R signal for CRT output
12	TV_HGND	-	GND	40	G_OUT	O	G signal for CRT output
13	FBP_SCP	I	Flyback pulse (H. pulse)	41	B_OUT	O	B signal for CRT output
14	HOUT	O	H. drive (oscillation)	42	RGB_Vcc	I	9V (for RGB process circuit)
15	H_Vcc	I	9V (for H. oscillation start)	43	IK_IN	I	Not used
16	HAFC_1	-	H. AFC filter	44	TV_DGND	-	GND
17	Vsaw	-	V. saw filter	45	uP_AGND	-	GND
18	VOUT	O	V. drive	46	uP_AVdd	-	5V
19	EW_OUT	O	Parabola waveform (for sidepin correection)	47	MAIN_POWER	O	Power on/off switching control [Powen on: L]
20	X-RAY	I	X-ray detection (for protection) [Detection : H]	48	PANORAMA	I	Not used: Aspect size control [PANORAMA: L]
21	Ys	I	Not used	49	SDA0	I/O	Data for Inter IC control bus (for various devices)
22	Cb_IN	I	Cb (external) signal	50	SCL0	O	Clock for Inter IC control bus (for various devices)
23	Y_IN	I	Y (external) signal	51	SDA1	I/O	Data for Inter IC control bus (for main memory)
24	Cr_IN	I	Cr (external) signal	52	A_MUTING	O	Audio muting [Muting : H]
25	TV_DVcc	I	3.3V	53	SCL1	O	Clock for Inter IC control bus (for main memory)
26	V3IN/CIN	I	Chroma signal (for YC separation output)	54	LED	O	POWER / ON TIMER LED Indication [lighting : L]
27	EHT_IN	I	Not used	55	REMOCON	I	Remote control sensor input [No input : H]
28	V2_IN/Y_IN	I	Y signal (for YC separation output)	56	ASP_ABL	I	Not used

SECTION 3
DISASSEMBLY

3.1 DISASSEMBLY PROCEDURE

3.1.1 REMOVING THE REAR COVER

(1) Disconnect the power plug.
(2) Remove the 11 screws **[A]**.
(3) Withdraw the REAR COVER backward.

3.1.2 REMOVING THE AV TERMINAL BOARD

• Remove the REAR COVER.
(1) Remove the 4 screws **[B]**.
(2) Withdraw the AV TERMINAL BOARD toward you.

3.1.3 REMOVING THE CHASSIS

• Remove the REAR COVER.
• Remove the AV TERMINAL BOARD.
(1) Slightly raise the both sides of CHASSIS by hand.
(2) Remove the 2 claws under the both side of the CHASSIS from the front cabinet.
(3) Withdraw the CHASSIS backward.
(If necessary, remove the wire clamp, connectors etc.)

3.1.4 REMOVING THE SPEAKER

• Remove the REAR COVER.
(1) Remove the 2 screws **[C]**, then remove the SPEAKER with SPEAKER HOLDER.
(2) Remove the 2 screws **[D]**, then remove the SPEAKER from the SPEAKER HOLDER.
(3) Follow the same steps when removing the other hand SPEAKER.

NOTE :

When remove the 2 screws **[C]** of the SPEAKER, remove the lower side screw first, and then remove the upper one.

3.1.5 REMOVING THE LED & POWER SW PWB

• Remove the REAR COVER.
(1) Remove the 2 screws **[E]**.
(2) Withdraw the LED & POWER SW PWB toward you.

*If necessary, remove the wire clamp, connector etc.

3.1.6 REMOVING THE FRONT CONTROL PWB

• Remove the REAR COVER.
(1) Remove the 2 screws **[F]**.
(2) Withdraw the FRONT CONTROL PWB toward you.

*If necessary, remove the wire clamp, connector etc.

3.1.7 CHECKING THE CHASSIS

To check the PW Board from back side.
(1) Pull out the CHASSIS (refer to REMOVING THE CHASSIS).
(2) Erect the CHASSIS vertically with the HVT side facing up so that you can easily check the back side of the PW board.

CAUTION :

- When erecting the CHASSIS, be careful so that there will be no contacting with other PW Board.
- Before turning on power, make sure that the wire connector is properly connected.
- **When conducting a check with power supplied, be sure to confirm that the CRT EARTH WIRE (BRAIDED ASS'Y) is connected to the CRT SOCKET PWB.**

3.1.8 WIRE CLAMPING AND CABLE TYING

(1) Be sure to clamp the wire.
(2) Never remove the cable tie used for tying the wires together. Should it be inadvertently removed, be sure to tie the wires with a new cable tie.

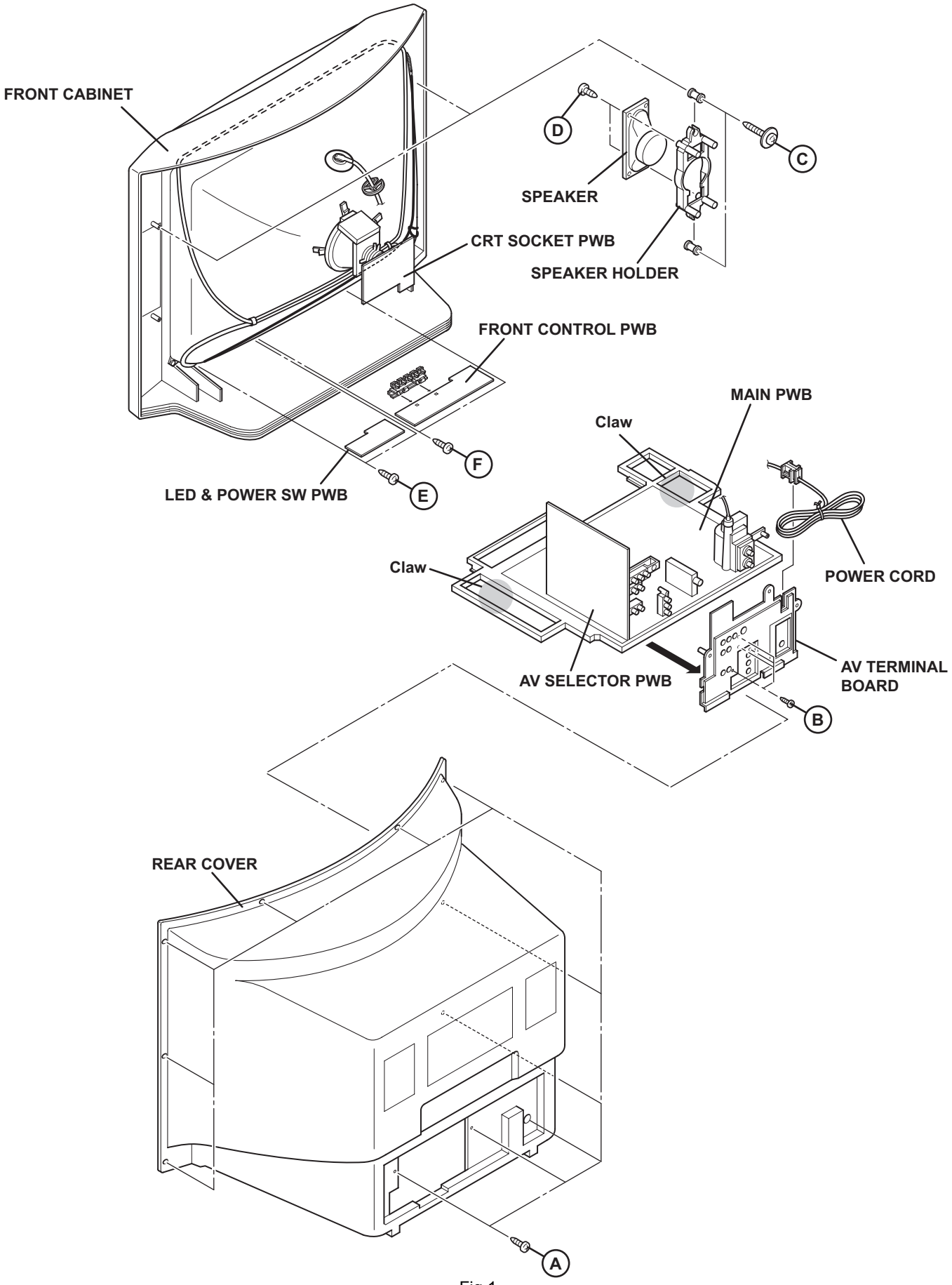

FRONT CABINET
D
C
SPEAKER
CRT SOCKET PWB
SPEAKER HOLDER
FRONT CONTROL PWB
MAIN PWB
Claw
F
E
LED & POWER SW PWB
Claw
POWER CORD
AV SELECTOR PWB
AV TERMINAL BOARD
B
REAR COVER
A

Fig.1

3.1.9 REMOVING THE CRT

NOTE:

- Replacement of the CRT should be performed by 2 or more persons.
- After removing the REAR COVER, CHASSIS etc.,

(1) Putting the CRT change table on soft cloth, the CRT change table should also be covered with such soft cloth (shown in Fig. 2).

(2) While keeping the surface of CRT down, mount the TV set on the CRT change table balanced will as shown in Fig. 2.

(3) Remove 4 screws marked by arrows with a box type screw-driver as shown in Fig. 3.

NOTE:

Since the cabinet will drop when screws have been removed, be sure to support the cabinet with hands.

(4) After 4 screws have been removed, put the cabinet slowly on cloth (At this time, be carefully so as not to damage the front
surface of the cabinet) shown in Fig. 4.

NOTE:

- The CRT should be assembled according to the opposite sequence of its dismounting steps.
- The CRT change table should preferably be smaller that the CRT surface, and its height be about 35cm.

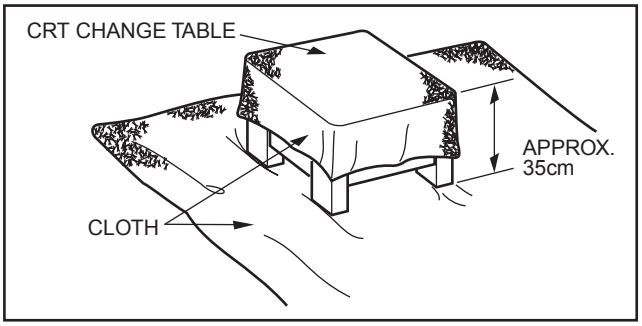


Fig.2

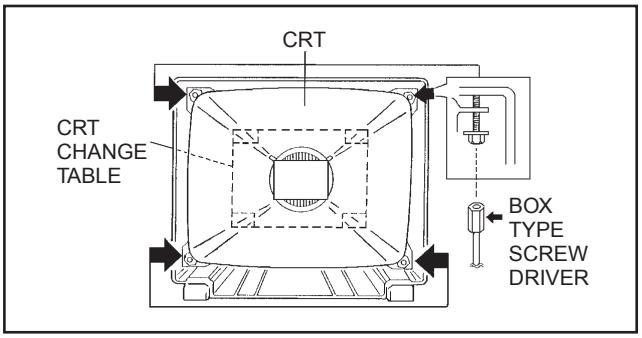


Fig.3

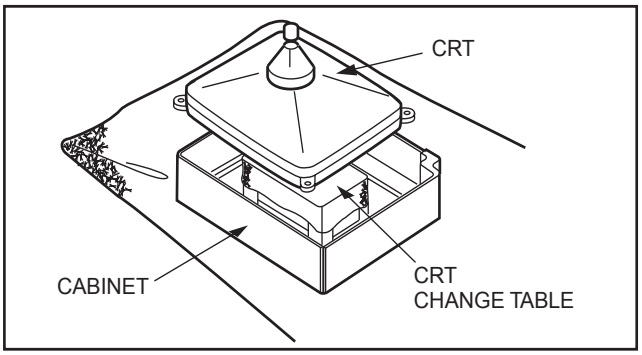


Fig.4

COATING OF SILICON GREASE FOR ELECTRICAL INSULATION ON THE CRT ANODE CAP SECTION.

Subsequent to replacement of the CRT and HV transformer or repair of the anode cap, etc. by dismounting them, be sure to coat silicon grease for electrical insulation as shown in Fig.5.Wipe around the anode button with clean and dry cloth. (Fig.5)Coat silicon grease on the section around the anode button. At this time, take care so that any silicon greases dose not sticks to the anode button. (Fig.6)

Silicon grease product No. KS - 650N

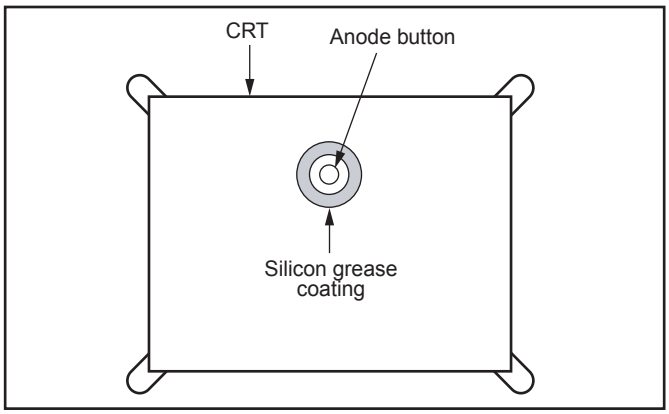


Fig.5

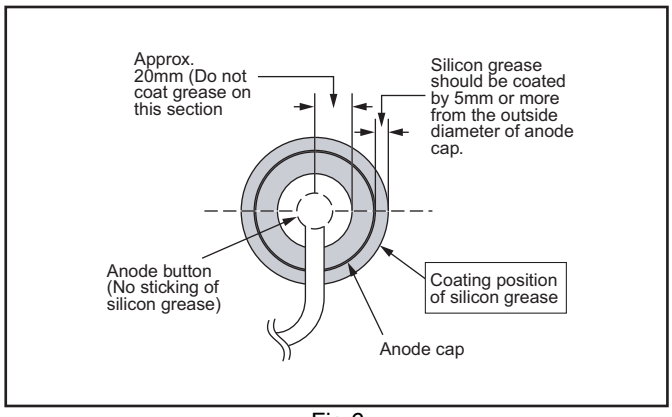


Fig.6

3.2 MEMORY IC REPLACEMENT

- This model uses the memory IC.
- This memory IC stores data for proper operation of the video and drive circuits.
- When replacing, be sure to use an IC containing this (initial value) data.

3.2.1 MEMORY IC REPLACEMENT PROCEDURE

1. Power off
Switch off the power and disconnect the power plug.

2. Replace the memory IC
Be sure to use a memory IC written with the initial setting data.

3. Power on
Connect the power cord to the wall outlet and switch on the power.

4. Receiving channel setting
Refer to the OPERATING INSTRUCTIONS (USER'S GUIDE) and set the receive channels (Channels Preset) as described.

5. User settings
Check the user setting items according to the "FACTORY SETTING ITEM" table.
Where these do not agree, refer to the OPERATING INSTRUCTIONS (USER'S GUIDE) and set the items as described.

6. SERVICE MODE setting
Verify what to set in the SERVICE MODE, and set whatever is necessary(Fig.1) .
Refer to the SERVICE ADJUSTMENT for setting.

3.2.2 SERVICE MODE SETTING ITEMS

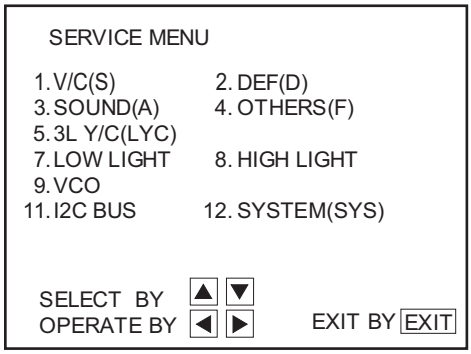


Fig.1

Setting items	Settings	Item No.
1. V/C(S) (Video setting)	Adjust	S01~S48
2. DEF(D) (Deflection setting)	Adjust	D01~D33
3. SOUND(A) (Audio setting)	Adjust	A01~A08
4. OTHERS [Do not adjust] (Factory setting)	Fixed	F01~F18
5. 3L Y/C(LYC) [Do not adjust] (Y/C separate setting)	Fixed	LYC01~LYC12
7. LOW LIGHT (White balance setting)	Adjust	---
8. HIGH LIGHT (White balance setting)	Adjust	---
9. VCO (VCO setting)	Adjust	---
11. I2C BUS [Do not adjust] (I^2C BUS setting)	Fixed	---
12.SYSTEM (SYS) (System constant setting)	Fixed	SYS01~SYS26

3.2.3 SETTINGS OF FACTORY SHIPMENT

3.2.3.1 BUTTON OPERATION

Setting item	Setting position
POWER	Off
CHANNEL	CH-02
VOLUME	10

3.2.3.2 REMOTE CONTROL DIRECT OPERATION

Setting item		Setting position
INPUT		TV
CHANNEL		CH-02
VOLUME		10
MUTING		OFF
DISPLAY		OFF
SLEEP TIMER		OFF
THEATER PRO		OFF
VIDEO STATUS		DYNAMIC
ASPECT		4 : 3
SOUND	HYPER SURROND	OFF
	BBE	ON

3.2.3.3 REMOTE CONTROL MENU OPERATION

(1) PICTURE ADJUST

Setting item	Setting position
TINT	0
COLOR	0
PICTURE	+8
BRIGHT	0
DETAIL	+8
COLOR TEMPERATURE	HIGH
NOISE MUTING	ON
VSM	ON

(2) SOUND ADJUST

Setting item	Setting position
BASS	0
TREBLE	0
BALANCE	0
MTS	STEREO
SMART SOUND	OFF

(3) CLOCK / TIMERS

Setting item	Setting position
SET CLOCK	OFF
ON / OFF TIMER	OFF

(4) INITIAL SETUP

Setting item	Setting position
LANGUAGE	ENG.
CLOSED CAPTION	OFF(CC1/T1)
FRONT PANEL LOCK	OFF
AUTO SHUT OFF	OFF
XDS ID	ON
V-CHIP	OFF

3.3 REPLACEMENT OF CHIP COMPONENT

3.3.1 CAUTIONS

(1) Avoid heating for more than 3 seconds.
(2) Do not rub the electrodes and the resist parts of the pattern.
(3) When removing a chip part, melt the solder adequately.
(4) Do not reuse a chip part after removing it.

3.3.2 SOLDERING IRON

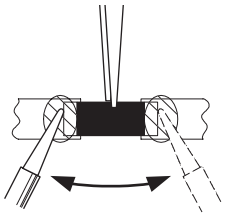
(1) Use a high insulation soldering iron with a thin pointed end of it.
(2) A 30w soldering iron is recommended for easily removing parts.

3.3.3 REPLACEMENT STEPS

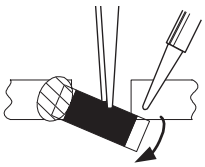
1. How to remove Chip parts

[Resistors, capacitors, etc.]

(1) As shown in the figure, push the part with tweezers and alternately melt the solder at each end.



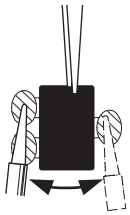
(2) Shift with the tweezers and remove the chip part.



[Transistors, diodes, variable resistors, etc.]

(1) Apply extra solder to each lead.

(2) As shown in the figure, push the part with tweezers and alternately melt the solder at each lead. Shift and remove the chip part.

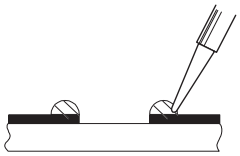


NOTE :
After removing the part, remove remaining solder from the pattern.

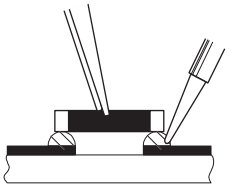
2. How to install Chip parts

[Resistors, capacitors, etc.]

(1) Apply solder to the pattern as indicated in the figure.

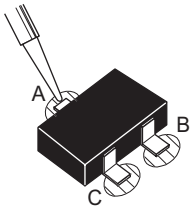


(2) Grasp the chip part with tweezers and place it on the solder. Then heat and melt the solder at both ends of the chip part.

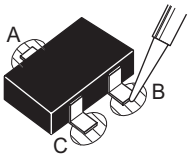


[Transistors, diodes, variable resistors, etc.]

(1) Apply solder to the pattern as indicated in the figure.
(2) Grasp the chip part with tweezers and place it on the solder.
(3) First solder lead **A** as indicated in the figure.



(4) Then solder leads **B** and **C**.



SECTION 4
ADJUSTMENT

4.1 ADJUSTMENT PREPARATION

(1) **There are 2 ways of adjusting this TV : One is with the REMOTE CONTROL UNIT and the other is the conventional method using adjustment parts and components.**
(2) **The adjustment using the REMOTE CONTROL UNIT is made on the basis of the initial setting values. The setting values which adjust the screen to the optimum condition can be different from the initial setting values.**
(3) Make sure that connection is correctly made AC to AC power source.
(4) Turn on the power of the TV and measuring instruments for warming up for at least 30 minutes before starting adjustments.
(5) If the receive or input signal is not specified, use the most appropriate signal for adjustment.
(6) Never touch the parts (such as variable resistors, transformers and condensers) not shown in the adjustment items of this service adjustment.

4.2 PRESET SETTING BEFORE ADJUSTMENTS

Unless otherwise specified in the adjustment items, preset the following functions with the REMOTE CONTROL UNIT.

Item	Preset value
VIDEO STATUS	STANDARD
PICTURE adjustment	All 00
COLOR TEMPERATURE	LOW
VSM	OFF
SOUND adjustment	All 00
BBE	OFF
HYPER SORROUND	OFF
ASPECT	4 : 3

4.3 MEASURING INSTRUMENT AND FIXTURES

- DC voltmeter (or digital voltmeter)
- Oscilloscope
- Signal generator (Pattern generator) [NTSC]
- TV audio multiplex signal generator
- Remote control unit

4.4 ADJUSTMENT ITEMS

■CHECK ITEM
- B1 VOLTAGE check
- HIGH VOLTAGE HOLD DOWN check

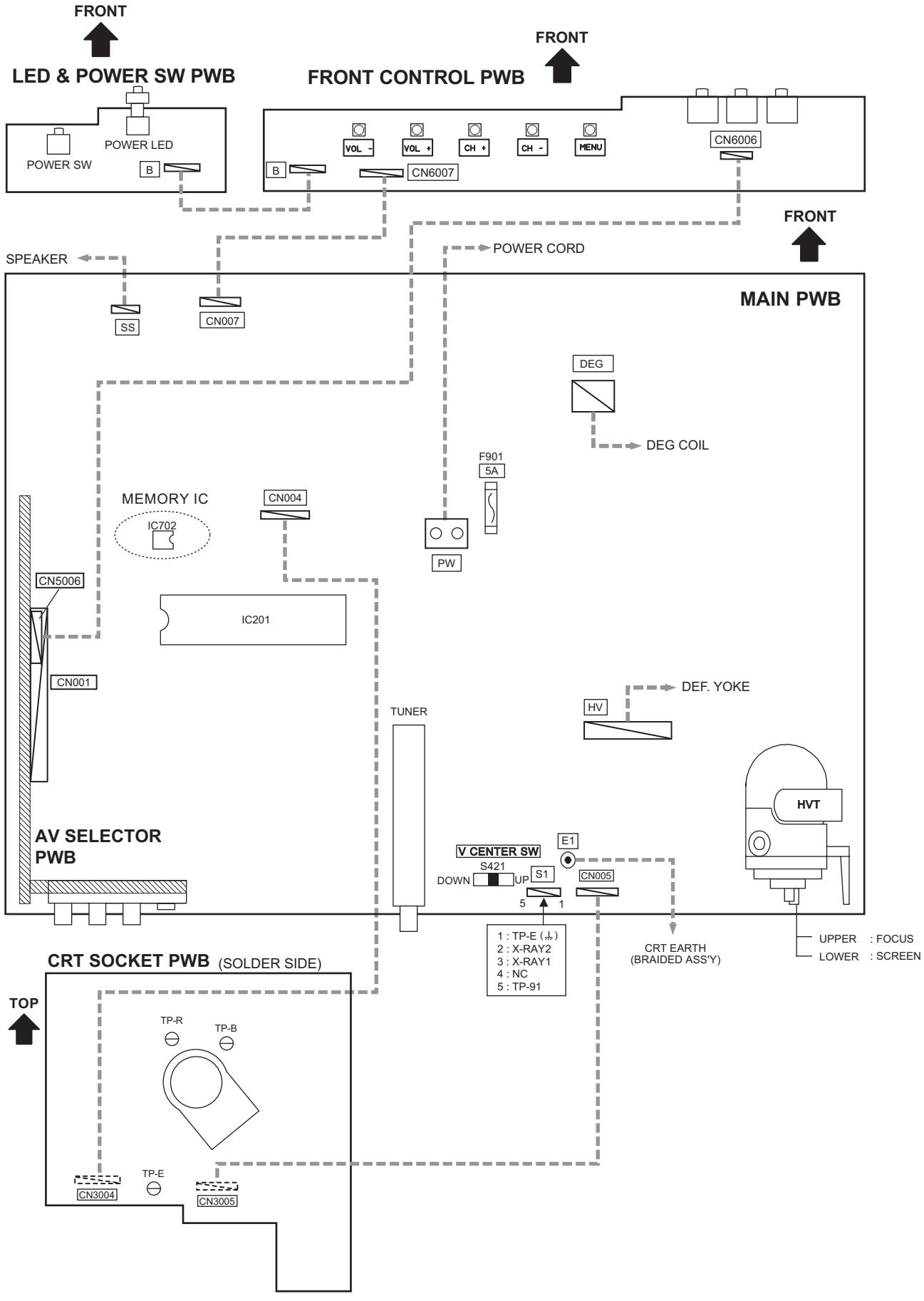
■FOCUS
- FOCUS adjustment

■DEFLECTION CIRCUIT
- V. SIZE / V. POSITION (4:3) adjustment
- V. SIZE / V. POSITION (16:9) adjustment
- H. POSITION / H. SIZE / SIDE PIN (4:3) / (16:9) adjustment

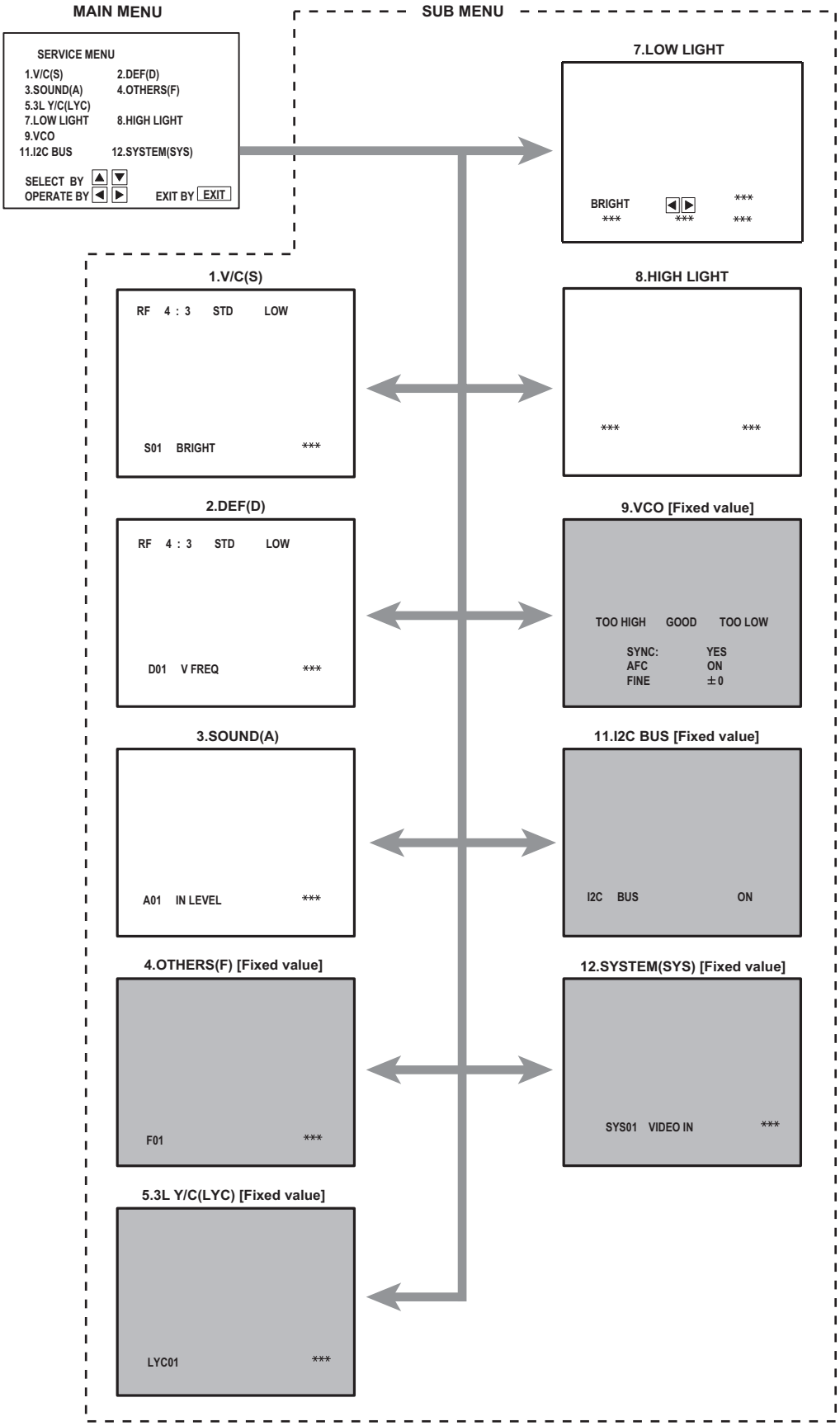
■VIDEO CIRCUIT
- WHITE BALANCE(High Light & Low Light) adjustment
- SUB BRIGHT adjustment
- SUB CONTRAST adjustment

■MTS CIRCUIT
- MTS INPUT LEVEL adjustment
- MTS SEPARATION adjustment

4.5 ADJUSTMENT LOCATIONS



4.6 BASIC OPERATION OF SERVICE MODE



4.6.1 TOOL OF SERVICE MODE OPERATION

Operate the SERVICE MODE with the REMOTE CONTROL UNIT.

4.6.2 SERVICE MODE ITEMS

In general, basic setting (adjustments) items or verifications are performed in the SERVICE MODE.

1. V/C (S)	This sets the setting values of the VIDEO circuit.
2. DEF (D)	This sets the setting values of the DEFLECTION circuit.
3. SOUND (A)	This sets the setting values of the AUDIO circuit.
4. OTHERS (F)	This sets the setting values of the factory settings. **[Do not adjust]**
6. 3L Y/C(LYC)	This sets the setting values of the 3 line YC separation control circuit. **[Do not adjust]**
7. LOW LIGHT	This sets the setting values of the WHITE BALANCE (LOW LIGHT) control circuit.
8. HIGH LIGHT	This sets the setting values of the WHITE BALANCE (HIGH LIGHT) control circuit.
9. VCO	This sets the setting values of the VCO control circuit. **[Do not adjust]**
11. I2C BUS	This sets the setting values of the I^2C BUS control circuit. **[Do not adjust]**
12. SYSTEM(SYS)	This sets the setting values of the system control circuit. **[Do not adjust]**

4.6.3 HOW TO ENTER THE SERVICE MODE

(1) Set to 0 minutes using the **[SLEEP TIMER]** key.
(2) Press the **[VIDEO STATUS]** key and **[DISPLAY]** key simultaneously while "**0 MIN**" is displayed, then enter the SERVICE MODE.

NOTE:

Before entering the SERVICE MODE, confirm that the setting of TV / CATV switch of the REMOTE CONTROL UNIT is at the "**TV**" side and the setting of VCR / DVD switch is at the "**VCR**" side. If the switches have not been properly set, you cannot enter the SERVICE MODE.

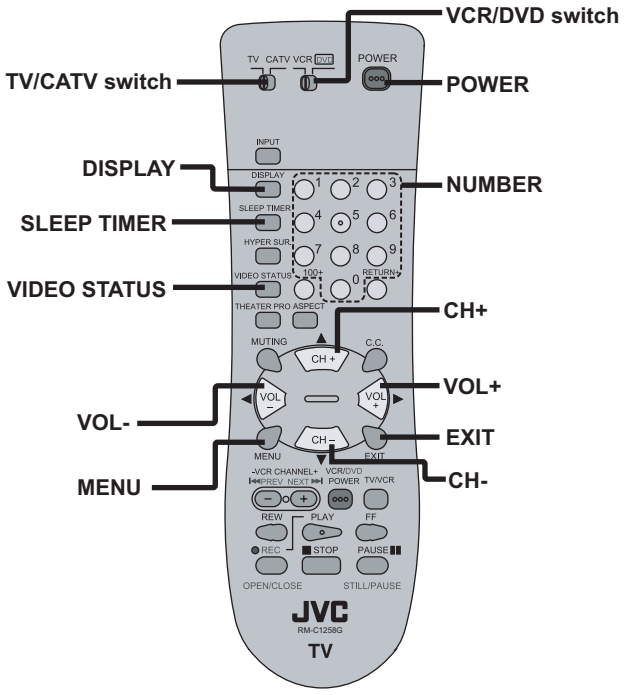
4.6.4 HOW TO STORE OF SETTING VALUE

The setting value will be stored automatically when release the REMOTE CONTROL UNIT keys

4.6.5 HOW TO EXIT THE SERVICE MODE

Press the **[EXIT]** key to exit the SERVICE MODE.

SERVICE MODE SELECT KEY



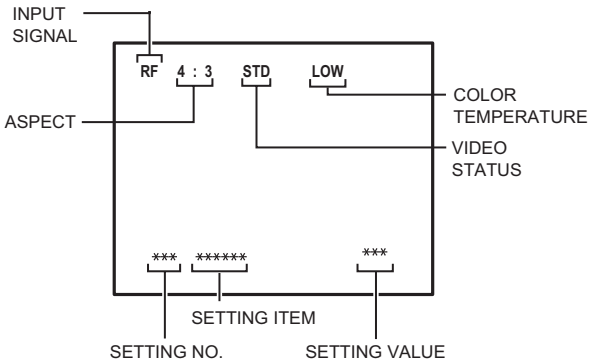
4.6.6 SERVICE MODE SETTING

1. V/C, 2. DEF

- Press **[CH+]** / **[CH-]** key
  For scrolling up/down the adjustment item.
- Press **[VOL+]** / **[VOL-]** key
  For scrolling up/down the data values.

NOTE:

The setting value will be stored automatically when release the REMOTE CONTROL UNIT keys.



(1) INPUT SIGNAL

RF	: Antenna input
COMP	: External (Component) input
EXT	: External (S / Composite) input

(2) ASPECT

4 : 3	: 4 : 3 screen mode
16 : 9	: 16 : 9 screen mode

(3) VIDEO STATUS

STD	: STANDARD
THEA	: THEATER

(4) COLOR TEMPERATURE

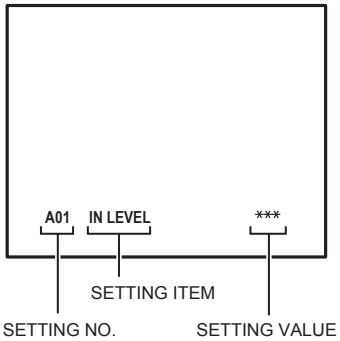
HIGH	: White balance high mode
LOW	: White balance low mode

3. SOUND (A)

- Press **[CH+]** / **[CH-]** key
  For scrolling up/down the adjustment item.
- Press **[VOL+]** / **[VOL-]** key
  For scrolling up/down the data values.

NOTE:

The setting value will be stored automatically when release the REMOTE CONTROL UNIT keys.

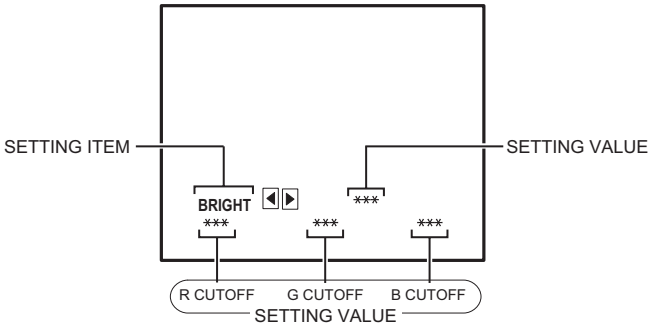


7. LOW LIGHT

The settings for WHITE BALANCE(LOW LIGHT) control circuit.

NOTE:

The setting value will be stored automatically when release the REMOTE CONTROL UNIT keys.

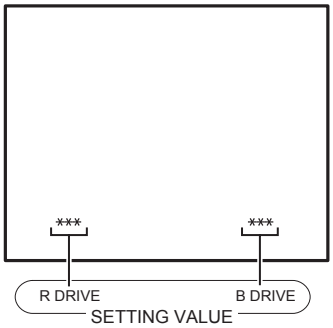


8. HIGH LIGHT

The settings for WHITE BALANCE(HIGH LIGHT) control circuit.

NOTE:

The setting value will be stored automatically when release the REMOTE CONTROL UNIT keys.



4.7 INITIAL SETTING VALUE OF SERVICE MODE

(1) Adjustment of the SERVICE MODE is made on the basis of the initial setting values ; however, the new setting values which set the screen in its optimum condition may differ from the initial setting.
(2) Do not change the initial setting values of the setting items NOT LISTED IN ADJUSTMENT PROCEDURE.
(3) --- : This mark described in each table shows "Cannot adjust it."

4.7.1 [1.V/C(S)]

No.	Setting item	Variable range	Initial setting value				
			AV-27F476/R AV-27F476/S				
			RF			EXTERNAL (S / COMPOSITE)	EXTERNAL (COMPONENT)
			STANDARD		THEATER	STANDARD	STANDARD
			4 : 3	16 : 9	4 : 3	4 : 3	4 : 3
S01	BRIGHT	0 - 127	64	---	---	---	---
S02	PICTURE	0 - 127	55	---	---	---	---
S03	COLOR	0 - 127	48	---	---	---	48
S04	TINT	0 - 127	50	---	---	---	72
S05	DETAIL	0 - 63	35	---	---	40	40
S06	BRIGHT+-	-32 - +32	---	±0	+1	+4	-4
S07	PICT+-	-32 - +32	---	-8	-7	+3	+3
S08	COLOR+-	-32 - +32	---	±0	-3	-3	---
S09	TINT+-	-32 - +32	---	±0	-3	+14	---
S10	DETAIL+-	-32 - +32	---	---	±0	---	---

No.	Setting item	Variable range	Initial setting value				
			AV-32F476/Y				
			RF			EXTERNAL (S / COMPOSITE)	EXTERNAL (COMPONENT)
			STANDARD		THEATER	STANDARD	STANDARD
			4 : 3	16 : 9	4 : 3	4 : 3	4 : 3
S01	BRIGHT	0 - 127	64	---	---	---	---
S02	PICTURE	0 - 127	55	---	---	---	---
S03	COLOR	0 - 127	45	---	---	---	43
S04	TINT	0 - 127	58	---	---	---	70
S05	DETAIL	0 - 63	35	---	---	40	40
S06	BRIGHT+-	-32 - +32	---	±0	+3	-2	-2
S07	PICT+-	-32 - +32	---	-8	-7	+2	+2
S08	COLOR+-	-32 - +32	---	±0	-3	±0	---
S09	TINT+-	-32 - +32	---	±0	-3	+6	---
S10	DETAIL+-	-32 - +32	---	---	±0	---	---

No.	Setting item	Variable range	Initial setting value				
			AV-32F476/Z				
			RF			EXTERNAL (S / COMPOSITE)	EXTERNAL (COMPONENT)
			STANDARD		THEATER	STANDARD	STANDARD
			4 : 3	16 : 9	4 : 3	4 : 3	4 : 3
S01	BRIGHT	0 - 127	64	---	---	---	---
S02	PICTURE	0 - 127	50	---	---	---	---
S03	COLOR	0 - 127	45	---	---	---	45
S04	TINT	0 - 127	56	---	---	---	70
S05	DETAIL	0 - 63	35	---	---	40	40
S06	BRIGHT+-	-32 - +32	---	±0	+3	-2	-3
S07	PICT+-	-32 - +32	---	-8	-7	+2	±0
S08	COLOR+-	-32 - +32	---	±0	-3	-1	---
S09	TINT+-	-32 - +32	---	±0	-3	+14	---
S10	DETAIL+-	-32 - +32	---	---	±0	---	---

No.	Setting item	Variable range	Initial setting value							
			AV-27F476/R AV-27F476/S							
			RF / EXTERNAL (S / COMPOSITE)				EXTERNAL (COMPONENT)			
			STANDARD		THEATER		STANDARD		THEATER	
			LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH
S11	R CUT OFF	0 - 255	30	---	---	---	---	---	---	---
S12	G CUT OFF	0 - 255	30	---	---	---	---	---	---	---
S13	B CUT OFF	0 - 255	30	---	---	---	---	---	---	---
S14	R DRIVE	0 - 127	64	---	---	---	---	---	---	---
S15	B DRIVE	0 - 127	64	---	---	---	---	---	---	---
S16	R CUT +-	-128 - +127	---	±0	±0	±0	-5	---	---	---
S17	G CUT +-	-128 - +127	---	±0	±0	±0	±0	---	---	---
S18	B CUT +-	-128 - +127	---	±0	±0	±0	-6	---	---	---
S19	R DRV +-	-128 - +127	---	+5	+13	+7	±0	---	---	---
S20	B DRV +-	-128 - +127	---	+6	-25	-9	±0	---	---	---
S21	NTSC MAT	0 - 3	3	3	1	1	2	2	1	1
S22	BLACK ST	0 - 3	2	---	2	---	---	---	---	---
S23	DC REST	0 - 1	1	---	1	---	---	---	---	---
S24	DCRSW	0 - 1	1	---	1	---	---	---	---	---

No.	Setting item	Variable range	Initial setting value							
			AV-32F476/Y AV-32F476/Z							
			RF / EXTERNAL (S / COMPOSITE)				EXTERNAL (COMPONENT)			
			STANDARD		THEATER		STANDARD		THEATER	
			LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH
S11	R CUT OFF	0 - 255	30	---	---	---	---	---	---	---
S12	G CUT OFF	0 - 255	30	---	---	---	---	---	---	---
S13	B CUT OFF	0 - 255	30	---	---	---	---	---	---	---
S14	R DRIVE	0 - 127	64	---	---	---	---	---	---	---
S15	B DRIVE	0 - 127	64	---	---	---	---	---	---	---

No.	Setting item	Variable range	Initial setting value							
			AV-32F476/Y AV-32F476/Z							
			RF / EXTERNAL (S / COMPOSITE)				EXTERNAL (COMPONENT)			
			STANDARD		THEATER		STANDARD		THEATER	
			LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH
S16	R CUT +-	-128 - +127	---	±0	±0	±0	±0	---	---	---
S17	G CUT +-	-128 - +127	---	±0	±0	±0	±0	---	---	---
S18	B CUT +-	-128 - +127	---	±0	±0	±0	±0	---	---	---
S19	R DRV +-	-128 - +127	---	+5	+13	+7	±0	---	---	---
S20	B DRV +-	-128 - +127	---	+6	-25	-9	±0	---	---	---
S21	NTSC MAT	0 - 3	3	3	1	1	2	2	1	1
S22	BLACK ST	0 - 3	2	---	2	---	---	---	---	---
S23	DC REST	0 - 1	1	---	1	---	---	---	---	---
S24	DCRSW	0 - 1	1	---	1	---	---	---	---	---

No.	Setting item	Variable range	Initial setting value		
			RF	EXTERNAL (S / COMPOSITE)	EXTERNAL (COMPONENT)
S25	ASSY SHRP	0 - 7	4	4	4
S26	BPF FO	0 - 1	0	0	---
S27	KILR OFF	0 - 1	0	0	---
S28	KILR SEN	0 - 1	1	1	---

No.	Setting item	Variable range	Initial setting value	
			AV-27F476/R AV-27F476/S	AV-32F476/Y AV-32F476/Z
S29	RGB MUTE	0 - 1	0	0
S30	BLUE B	0 - 1	0	0
S31	VIDEO SW	0 - 3	3	3
S32	CMP ABCL	0 - 1	0	0
S33	OSD ABL	0 - 1	0	0
S34	OSD CONT	0 - 63	7	8
S35	SUB CONT	0 - 15	5	5
S36	ABL GAIN	0 - 3	0	0
S37	ABL PNT	0 - 3	3	3
S38	Y GAMMA	0 - 3	1	1
S39	Y MUTE	0 - 1	0	0
S40	SVM GAIN	0 - 3	3	3
S41	SVM PH	0 - 3	1	2
S42	WPL	0 - 1	0	0
S43	COL GMM	0 - 1	0	0
S44	V1 GAIN	0 - 7	4	4
S46	VMOFF DE	-128 - +127	3	3
S47	APC CLK	0 - 1	1	1
S48	PIP ADJ	0 - 15	4	8

4.7.2 [2. DEF (D)]

No.	Setting item	Variable range	Initial setting value								
			AV-27F476/R AV-27F476/S			AV-32F476/Y			AV-32F476/Z		
			RF		EXTERNAL	RF		EXTERNAL	RF		EXTERNAL
			4 : 3	16 : 9	4 : 3	4 : 3	16 : 9	4 : 3	4 : 3	16 : 9	4 : 3
D01	V FREQ	0 - 3	0	0	3	0	0	3	0	0	3
D02	AFC GAIN	0 - 3	0	0	2	0	0	2	0	0	2
D03	H POSI	0 - 31	21	---	21	19	---	19	19	---	19
D04	H POSI+-	-128 - +127	---	0	---	---	0	---	---	0	---
D05	V PHASE	0 - 7	0	---	0	0	---	0	0	---	0
D06	V PH+-	-128 - +127	---	0	---	---	0	---	---	0	---
D07	V SIZE	0 - 127	105	---	105	58	---	58	45	---	45
D08	V SIZE+-	-128 - +127	---	-30	---	---	-30	---	---	-30	---
D09	V CENTER	0 - 63	32	---	32	32	---	32	32	---	32
D10	V CENT+-	-128 - +127	---	0	---	---	0	---	---	0	---
D11	V S CORR	0 - 15	7	---	7	9	---	9	8	---	8
D12	V S CO+-	-128 - +127	---	0	---	---	0	---	---	0	---
D13	V LIN	0 - 15	10	---	10	10	---	10	8	---	8
D14	V LIN+-	-128 - +127	---	0	---	---	0	---	---	0	---
D15	H SIZE	0 - 63	38	---	38	49	---	49	28	---	28
D16	H SIZE+-	-128 - +127	---	0	---	---	0	---	---	0	---
D17	WVMT TOP	0 - 3	0	1	0	0	1	0	0	1	0
D18	WVMT BTM	0 - 3	0	1	0	0	1	0	0	1	0
D19	EWCR TOP	0 - 31	14	---	14	14	---	14	11	---	11
D20	EWCR T+-	-128 - +127	---	0	---	---	0	---	---	0	---
D21	EWCR BTM	0 - 31	13	---	13	16	---	16	11	---	11
D22	EWCR B+-	-128 - +127	---	0	---	---	0	---	---	0	---
D23	EW PARA	0 - 63	42	---	42	35	---	35	31	---	31
D24	EW PARA+-	-128 - +127	---	-15	---	---	-16	---	---	-16	---
D25	V EHT	0 - 7	0	---	0	0	---	0	0	---	0
D26	V EHT+-	-128 - +127	---	0	---	---	0	---	---	0	---
D27	H EHT	0 - 7	0	---	0	0	---	0	0	---	0
D28	H EHT+-	-128 - +127	---	0	---	---	0	---	---	0	---
D29	TRAPEZ	0 - 63	30	---	30	34	---	34	36	---	36
D30	TRAPEZ+-	-128 - +127	---	0	---	---	0	---	---	0	---
D31	V AGC	0 - 1	0	0	0	0	0	0	0	0	0
D32	BLANK SW	0 - 1	0	0	0	0	0	0	0	0	0
D33	VRMP BI	0 - 1	0	0	0	0	0	0	0	0	0

4.7.3 [3. SOUND(A)]

No.	Setting item	Variable range	Initial setting value
A01	IN LEVEL	0 - 15	9
A02	LOW SEP	0 - 63	41
A03	HI SEP	0 - 63	36
A04	SAPC	0 - 1	0
A05	BBE BASS	-128 - +127	-2
A06	BBE TRE	-128 - +127	-2
A07	AHS MVE	-128 - +127	±0
A08	AHS MSC	-128 - +127	±0

4.7.4 [4. OTHERS(F)] [Do Not adjust : All fixed]

No.	Setting item	Variable range	Initial setting value		Initial setting value	
			AV-27F476/R	AV-27F476/S	AV-32F476/Y	AV-32F476/Z
F01	OSD POSI	0 - 255	39	39	42	42
F02	OSD FREQ	0 - 255	90	90	90	90
F03	CCD POSI	0 - 255	42	42	48	48
F04	CCD FREQ	0 - 255	91	91	93	93
F05	CCD CONT	0 - 63	4	4	4	4
F06	PUR WBCK	0 - 1	0	0	0	0
F07	PUR CONT	0 - 63	2	2	2	2
F08	CCD PCHK	0 - 1	1	1	1	1
F09	VMOFF	0 - 1	0	0	0	0
F10	VNR CHK	0 - 255	3	3	3	3
F11	VCSN TM	0 - 255	5	5	5	5
F12	VM DAT A	-128 - +127	+8	+127	+8	+8
F13	VM DAT B	-128 - +127	+8	+8	-8	-8
F14	VM DAT C	-128 - +127	-20	-8	-20	-20
F15	VM DAT D	-128 - +127	-32	-20	-32	-32
F16	VM DAT E	0 - 1	1	1	1	1
F17	XDSID TM	0 - 255	15	15	15	15
F18	FM TRAP	0 - 1	0	0	0	0

4.7.5 [5. 3L Y/C(LYC)] [Do not adjust : All fixed]

No.	Setting item	Variable range	Initial setting value
LYC01	MODE	0 - 7	4
LYC02	VENH	0 - 7	1
LYC03	PDSOFF	0 - 1	0
LYC04	CB	0 - 1	0
LYC05	VNLR	0 - 15	2
LYC06	GSEL0	0 - 1	0
LYC07	GSEL1	0 - 1	1
LYC08	COR	0 - 3	0
LYC09	TRAP	0 - 1	1
LYC10	CHTRAP	0 - 1	0
LYC11	CBPF	0 - 1	0
LYC12	ENHOFF	0 - 1	0

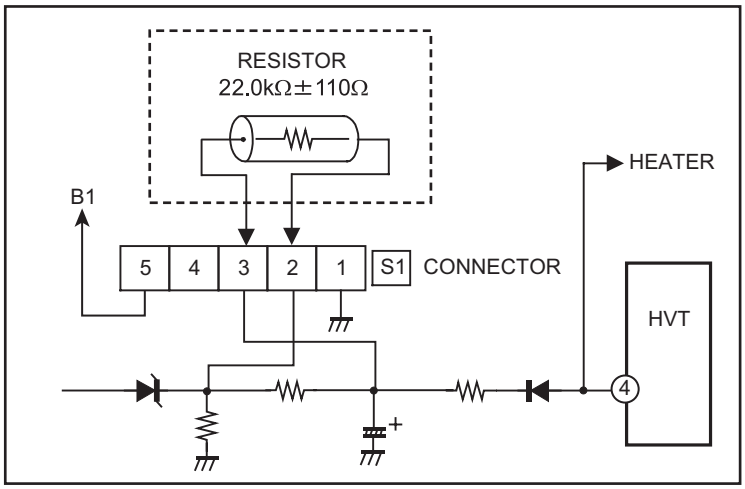
4.7.6 [12. SYSTEM(SYS)] [Do not adjust : All fixed]

No.	Setting item	Variable range	Initial setting value
SYS01	VIDEO IN	0 - 4	3
SYS02	VSM	0 - 1	1
SYS03	CLR TEMP	0 - 1	1
SYS04	THEATER	0 - 1	1
SYS05	THEA PRO	0 - 1	1
SYS06	GAME MD	0 - 1	0
SYS07	AHS	0 - 1	0
SYS08	HYPER SR	0 - 1	1
SYS09	BBE	0 - 1	1
SYS10	S SOUND	0 - 1	1
SYS11	16:9 MD	0 - 3	1
SYS12	S CCD	0 - 1	1
SYS13	ID DISP	0 - 1	1
SYS14	CH LAB	0 - 1	1
SYS15	V LAB	0 - 1	1
SYS16	W CLOCK	0 - 1	1
SYS17	PIM	0 - 1	1
SYS18	PURITY	0 - 1	0
SYS19	VOL MUTE	0 - 1	1
SYS20	VCHIP	0 - 1	1
SYS21	VCHIP CA	0 - 1	1
SYS22	CCD	0 - 1	1
SYS23	HYPSCAN	0 - 1	1
SYS24	JVC LOGO	0 - 1	1
SYS25	PANORAMA	0 - 1	0

4.8 ADJUSTMENT PROCEDURE

4.8.1 CHECK ITEM

Item	Measuring instrument	Test point	Adjustment part	Description
B1 VOLTAGE	DC voltmeter	S1 Connector 1-pin : TP-E 5-pin : TP-91B [MAIN PWB]		(1) Receive the black and white signal. (color off) (2) Connect the DC voltmeter to the 1-pin and 5-pin of **S1 connector**. (3) Confirm that the voltage is **DC134.5V±2V**.
HIGH VOLTAGE HOLD DOWN	Resistor (22.0kΩ, 1/4W)	S1 connector 2-pin : X-RAY2 3-pin : X-RAY1 [MAIN PWB]		• After repairing the high voltage hold down circuit. This circuit shall be checked to operate correctly. (1) Turn the power switch to on. (2) Refer to the figure, connect the resistor between **S1 connector** 2-pin and 3-pin. (3) Make sure that the screen picture disappeares. (4) Disconnect the power plug. (5) Remove the resistor. (6) Again connect the power plug. (7) Turn the power switch to on. (8) Make sure that the normal picture is displayed on the screen.

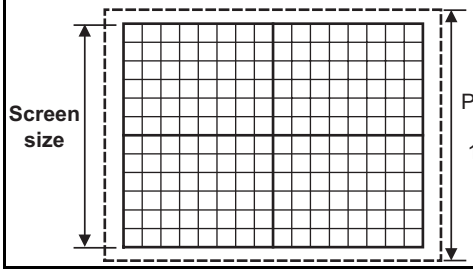


4.8.2 FOCUS

Item	Measuring instrument	Test point	Adjustment part	Description
FOCUS	Signal generator		FOCUS VR [In HVT]	(1) Receive the crosshatch signal. (2) While watching at the screen, adjust the **FOCUS VR** to the vertical and horizontal lines will be thinnest and sharpest center horizontal line. (3) Make sure that the picture is in focus even when the screen gets darkened.

4.8.3 DEFLECTION CIRCUIT

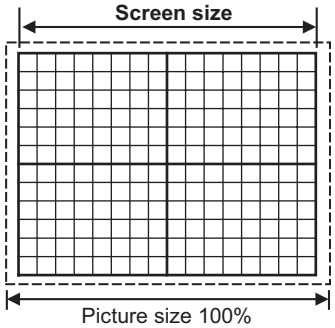
Item	Measuring instrument	Test point	Adjustment part	Description
V. SIZE / V. POSITION (4:3)	Signal generator Remote control unit		[2.DEF (D)] D05: V PHASE D07: V SIZE D11: VS CORR D13: V LIN V. CENTER SW (S1421) [MAIN PWB]	(1) Receive the crosshatch signal. (2) Select **2.DEF(D)** from the SERVICE MODE. (3) Select **< D05 >** (V PHASE). (4) Set the initial setting of **< D05 >**. (5) Adjust V. CENTER SW to agree the vertical center with display center. (6) Select **< D07 >** (V SIZE). (7) Adjust **< D07 >** to the vertical screen size become setting value is **92%**. **NOTE:** • Bottom is to be located within the **85%-95%** range. • When vertical linearity is not even, adjust **< D13 >** (V LIN) and **< D11 >** (VS CORR) to vertical linearity

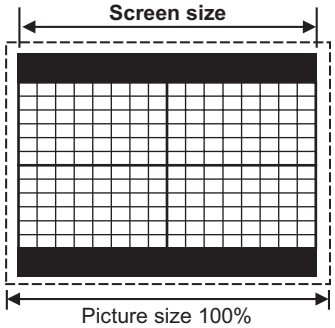


<table>
<tr><th>Item</th><th>Measuring instrument</th><th>Test point</th><th>Adjustment part</th><th>Description</th></tr>
<tr><td>V. SIZE /
V. POSITION
(16:9)</td><td>Signal generator

Remote control unit</td><td></td><td rowspan="2">[2.DEF (D)]
D08: V. SIZE+-
D14: V. LIN+-</td><td rowspan="2">• V. SIZE / V. POSITION (4:3) adjustment should be finished.
(1) Receive a black and white signal (color off).
(2) Select 16:9 mode.
(3) Confirm that the width of V. BLANKING is equal to adjustment value (B).
(4) If the value (B) is not correct, select 2.DEF(D) from the SERVICE MODE.
(5) Adjust < D08 > (V. SIZE+-) and < D14 > (V. LIN+-) to be same to adjustment value (B).
NOTE :
• When you change the VERTICAL adjustment value of the regular mode (4:3), review the adjustment of 16:9 mode again.</td></tr>
<tr><td colspan="3">

<table>
<tr><th>Adjust point</th><th>Setting value</th></tr>
<tr><td>B</td><td>50mm</td></tr>
</table></td></tr>
<tr><td>H. SIZE /
H. POSITION /
SIDE PIN
(4:3)</td><td>Signal generator

Remote control unit</td><td></td><td rowspan="2">[2.DEF (D)]
D03: H POSI
D15: H SIZE
D23: EW PARA
D19: EWCR TOP
D21: EWCR BTM</td><td rowspan="2">(1) Receive the crosshatch signal.
(2) Select 2.DEF(D) from the SERVICE MODE.
(3) Select < D03 > (H POSI).
(4) Adjust < D03 > to the left width and right width of the crosshatch screen becomes equal.
(5) Select < D15 > (H SIZE).
(6) Adjust < D15 > to the horizontal screen size become setting value is 90%.
(7) Select < D23 > (EW PARA).
(8) Adjust < D23 > to vertical line at both side to become straight.
(9) If it is necessary, readjust step 3 to 8.
NOTE:
If it is not straight at the vertical upper and bottom corner line, adjust the upper and bottom conrner pin by < D19 > (EWCR TOP) amd < D21 > (EWCR BTM).</td></tr>
<tr><td colspan="3"> 
</td></tr>
<tr><td>H. POSITION /
H. SIZE /
SIDE PIN
(16:9)</td><td>Signal generator

Remote control unit</td><td></td><td rowspan="2">[2.DEF (D)]
D16: H SIZE+-
D04: H POSI+-
D24: EW PARA+-
D20: EWCR T+-
D22: EWCR B+-</td><td rowspan="2">• V. SIZE / V. POSITION adjustment should be finished.
• H. SIZE / H. POSITION / SIDE PIN adjustment should be finished. (Regular size(4:3)).
(1) Receive the crosshatch signal.
(2) Select 16:9 mode.
(3) Select 2.DEF(D) from the SERVICE MODE.
(4) Confirm both sides of crosshatch to be the adjustment value 90%.
(5) If the value is not correct, adjust < D16 > (H SIZE+-) and < D04 > (H POSI+-) to the horizontal screen size become setting value is 90%.
(6) Confirm the second vertical line from left to right to be straight.
(7) If it is not straight, adjust to be straight by < D24 > (EW PARA+-), < D20 > (EWCR T+-) and < D22 > (EWCR B+-).
NOTE :
• Review the adjustment of 16:9 mode again when you change the SIDE PIN adjustment value of regular (4:3) mode.</td></tr>
<tr><td colspan="3"> 
</td></tr>
</table>

4.8.4 VIDEO CIRCUIT

<table>
<tr><th>Item</th><th>Measuring instrument</th><th>Test point</th><th>Adjustment part</th><th>Description</th></tr>
<tr><td>WHITE BALANCE (LOW LIGHT)</td><td>Signal generator

Remote control unit</td><td></td><td>[1.V/C (S)]
S01: BRIGHT
S11: R CUTOFF
S12: G CUTOFF
S13: B CUTOFF

[7.LOW LIGHT]

SCREEN VR
[in HVT]</td><td>(1) Receive the black and white signal (color off).
(2) Select the 1.V/C (S) from the SERVICE MODE.
(3) Confirm the initial setting value of < S11 > (R CUTOFF), < S12 > (G CUTOFF), < S13 > (B CUTOFF) and < S01 > (BRIGHT).
(4) Return to the main menu in SERVICE MODE.
(5) Select the 7.LOW LIGHT from the SERVICE MODE.
(6) Display a single horizontal line by pressing the [1] key.
(7) Turn the SCREEN VR all the way to the left.
(8) Turn the SCREEN VR gradually to the right from the left until either one of the red, blue or green colors appears faintly.
(9) Adjust the two colors which did not appear until the single horizontal line that is displayed becomes white using the [4] to [9] keys.
(10) Turn the SCREEN VR until the single horizontal line is displayed faintly.
(11) Press the [2] key to cancel the single horizontal line mode.
(12) Return to the main menu in SERVICE MODE.
(13) Select the 1.V/C (S) from the SERVICE MODE.
(14) Adjust the BRIGHT level to become the black component shines white slightly by < S01 >.
(15) Confirm that whether the color ingredient of R, G, or B is visible to the black component, which shines white slightly.
(16) When the color ingredient can be seen, two colors other than a visible color are adjusted, and it is made to look white.
(17) Return the value of < S01 > to initial setting value.

• The [3] (EXIT) key is the cancel key for the WHITE BALANCE.</td></tr>
<tr><td colspan="3">REMOTE CONTROL UNIT

H.LINE ON ① H.LINE OFF ② EXIT ③
R CUTOFF▲ ④ G CUTOFF▲ ⑤ B CUTOFF▲ ⑥
R CUTOFF▼ ⑦ G CUTOFF▼ ⑧ B CUTOFF▼ ⑨</td><td colspan="2"></td></tr>
<tr><td>WHITE BALANCE (HIGH LIGHT)</td><td>Signal generator

Remote control unit</td><td></td><td>[1.V/C (S)]
S14: R DRIVE
S15: B DRIVE

[8.HIGH LIHGT]</td><td>(1) Receive the black and white signal (color off).
(2) Select the 1.V/C (S) from the SERVICE MODE.
(3) Set the initial setting value of < S14 > (R DRIVE) and < S15 > (B DRIVE).
(4) Return to the main menu in SERVICE MODE.
(5) Select the 8.HIGH LIGHT from the SERVICE MODE.
(6) Adjust the screen until it becomes white using the [4], [6], [7] and [9] keys.

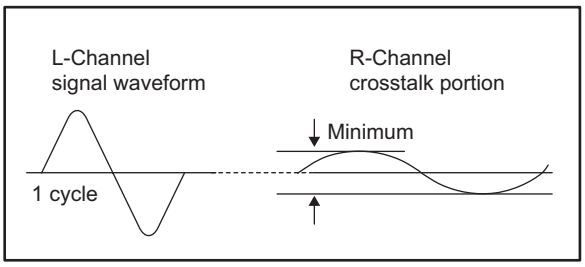
• The [3] (EXIT) key is the cancel key for the WHITE BALANCE.</td></tr>
<tr><td colspan="3">REMOTE CONTROL UNIT

① ② EXIT ③
R DRIVE▲ ④ ⑤ B DRIVE▲ ⑥
R DRIVE▼ ⑦ ⑧ B DRIVE▼ ⑨</td><td colspan="2"></td></tr>
<tr><td>SUB BRIGHT</td><td>Remote control unit</td><td></td><td>[1.V/C (S)]
S01: BRIGHT</td><td>(1) Receive any broadcast.
(2) Select the 1.V/C (S) from the SERVICE MODE.
(3) Select < S01 > (BRIGHT).
(4) Set the initial setting value of < S01 >.
(5) If the brightness is not the best with the initial setting value, make fine adjustment of < S01 > until you get the optimum brightness.</td></tr>
</table>

Item	Measuring instrument	Test point	Adjustment part	Description
SUB CONTRAST	Remote control unit		[1.V/C (S)] S02: PICTURE	(1) Receive any broadcast. (2) Select the **1.V/C (S)** from the SERVICE MODE. (3) Select **< S02 >** (PICTURE). (4) Set the initial setting value of **< S02 >**. (5) If the contrast is not the best with the initial setting value, make fine adjustment of the **< S02 >** until you get the optimum contrast.

4.8.5 MTS CIRCUIT

Item	Measuring instrument	Test point	Adjustment part	Description
MTS INPUT LEVEL	Remote control unit		[3.SOUND (A)] A01: IN LEVEL	(1) Receive any broadcast. (2) Select the **3.SOUND (A)** from the SERVICE MODE. (3) Select the **< A01 >** (IN LEVEL). (4) Set the initial setting value of **< A01 >**.
MTS SEPARATION	TV audio multiplex signal generator Oscilloscope Remote control unit	R OUT L OUT [AUDIO OUT]	[3.SOUND (A)] A02: LOW SEP. A03: HI SEP.	(1) Input the stereo L signal (300 Hz) from the TV audio multiplex signal generator to the antenna terminal. (2) Connect an oscilloscope to R OUT pin of the AUDIO OUT, and display one cycle portion of the 300 Hz signal. (3) Select the **3.SOUND (A)** from the SERVICE MODE. (4) Select the **< A02 >** (LOW SEP.). (5) Set the initial setting value of **< A02 >**. (6) Adjust the **< A02 >** so that the stroke element of the 300Hz signal will become minimum. (7) Change the connection of the oscilloscope to L OUT pin of the AUDIO OUT, and enlarge the voltage axis. (8) Change the signal to 3 kHz, and similarly adjust **< A03 >** (HI SEP.).



SECTION 5
TROUBLESHOOTING

This service manual does not describe TROUBLESHOOTING.

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